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Serial Number: 09/903,645
Group Art Unit: 2631
Examiner: To be declared
Title: METHOD AND APPARTUS FOR SEARCHING
FOR A PRE-DEFINED CODE IN A BIT STREAM
Filing Date: July 13, 2001
Inventors: Gus Vos; Ronald H. Gerhards; William Burchill
Agent's ref: 82446-1

October 22, 2001

U.S. Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231
United States

Dear Sir:

PRELIMINARY AMENDMENT

Please amend the subject application as follows:

In the claims:

Please amend claim 11 as follows:

11. The apparatus of claim 5 wherein said searcher is operable to produce said correlation result within a search window, over a dwell time, at a chip resolution and at a window start time offset relative to a timing signal, said start time offset being a fraction of said chip resolution.

Please amend claim 18 as follows:

- 18.** An apparatus for searching for a predefined code in a bit stream, the apparatus comprising:

an integrated circuit configured to search for correlation of said bit stream with a reference code applied to said bit stream at a plurality of different times according to a first resolution to produce a set of correlation values and associated times; and

a processor circuit in communication with said integrated circuit and configured to control said integrated circuit to initiate a first search for correlation of said bit stream with said reference code to produce a first set of correlation values and associated times and operable to initiate a second search for correlation of said bit stream with said reference code applied to said bit stream at a second plurality of different times to produce a second set of correlation values and associated times, said reference code being offset in time from a maximal correlation value of said first set such that said reference code is applied to said bit stream at times other than times of said first plurality, to produce a combined set correlation values operable to be used for determining a measure of the strength of said predefined code in said bit stream.

Please amend claim 19 as follows:

- 19.** A system comprising the apparatus of claim **18** and further comprising a baseband down converter for demodulating a quadrature encoded input signal to produce I and Q bit streams, said integrated circuit including a correlator for correlating said reference code with said I and Q bit streams.

In the specification:

The paragraph beginning at line 21 of page 4 has been amended as follows:

In addition, the time to search or memory requirements ordinarily associated with higher resolution searches are not significantly increased because the results of the first search may be limited to a small number of maximal values. For example, in one embodiment, the method may double the search resolution from $\frac{1}{2}$ chip to $\frac{1}{4}$ chip over the region of interest, but maintains a search cost that is roughly comparable to that of a $\frac{1}{2}$ chip resolution search. Furthermore, the peak signal strength loss associated with a $\frac{1}{2}$ chip resolution search can be 1.2 dB or higher (depending on the baseband filtering assumed), but a $\frac{1}{4}$ chip resolution search may cut this loss to less than $\frac{1}{4}$ db, thereby enhancing search accuracy.

The paragraph beginning at line 1 of page 7 has been amended as follows:

The controller may be operable to produce the correlation results within a search window, over a dwell time, at a chip resolution and at a window start time offset relative to a timing signal, the start time offset being a fraction of the chip resolution. The controller may be operable to supply search window, dwell time, resolution, and start time offset variables to the searcher to define parameters of the first and second searches. The controller may also be operable to supply a start time offset variable specifying a start time at a multiple of one-half of the resolution, relative to the maximal correlation value. The start time may be earlier than the time associated with the maximal correlation value of the first set by $\frac{5}{4}$ of a bit time of the reference code, for example.

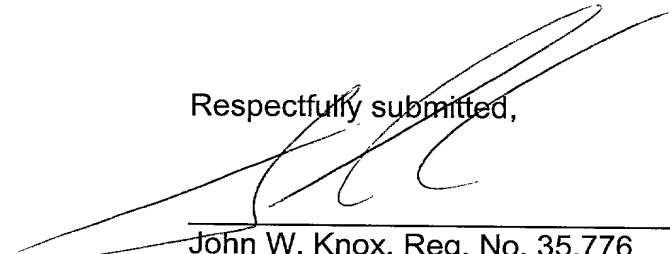
The paragraph beginning at line 10 of page 8 has been amended as follows:

In accordance with another aspect of the invention, there is provided a system incorporating the above apparatus, and further comprising a base band down converter for demodulating a quadrature encoded input signal to produce I and Q bit streams, the searcher including a correlator for correlating the reference code with the I and Q bit streams. The system may further comprise a receiver for receiving quadrature encoded pilot signals in a direct sequence spread spectrum (DS-SS) system, and be operable to use the combined set of correlation values to calculate the strength of a received pilot signal.

REMARKS

Claims 11, 18 and 19, and the disclosure at pages 4, 7 and 8 have been amended to correct editorial errors.

Respectfully submitted,



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JWK:djo

Encl.: Version with Markings to Show Changes Made



VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the specification:

The paragraph beginning at line 21 of page 4 has been amended as follows:

In addition, the time to search or memory requirements ordinarily associated with higher resolution searches are not significantly increased because the results of the first search may be limited to a small number of maximal values. For example, in one embodiment, the method may double the search resolution from $\frac{1}{2}$ chip to $\frac{1}{4}$ chip over the region of interest, but maintains a search cost that is roughly comparable to that of a $\frac{1}{2}$ chip resolution search. Furthermore, the peak signal strength loss associated with a $\frac{1}{2}$ chip resolution search can be 1.2 dB or higher (depending on the baseband filtering assumed), but a $\frac{1}{4}$ chip resolution search may cut this loss ~~by a quarter~~ to less than $\frac{1}{4}$ db, thereby enhancing search accuracy.

The paragraph beginning at line 1 of page 7 has been amended as follows:

The controller may be operable to produce the correlation results within a search window, over a dwell time, at a chip resolution and at a window start time offset relative to a timing signal, the start time offset being a fraction of the chip resolution. The controller may be operable to supply search window, dwell time, resolution, and start time offset variables to the searcher to define parameters of the first and second searches. The controller may also be operable to supply a start time offset variable specifying a start time at a multiple of one-half of the resolution, relative to the maximal correlation value. The start time may be earlier than the time associated with the maximal correlation value of the first set by $\frac{5}{4}$ of a bit time of the reference code, for example.

The paragraph beginning at line 10 of page 8 has been amended as follows:

In accordance with another aspect of the invention, there is provided a system incorporating the above apparatus, and further comprising a ~~demodulator~~ base band down converter for demodulating a quadrature encoded input signal to produce I and Q bit streams, the searcher including a correlator for correlating the reference code with the I and Q bit streams. The system may further comprise a receiver for receiving quadrature encoded pilot signals in a direct sequence spread spectrum (DS-SS) system, and be operable to use the combined set of correlation values to calculate the strength of a received pilot signal.

In the claims:

Claim 11 has been amended as follows:

11. The apparatus of claim 5 wherein said searcher is operable to produce said correlation result within a search window, over a dwell time, at a chip resolution and at a window start time offset relative to a timing signal, said start time offset being a fraction of said chip resolution.

Claim 18 has been amended as follows:

18. An apparatus for searching for a predefined code in a bit stream, the apparatus comprising:
 - an integrated circuit configured to search for correlation of said bit stream with a reference code applied to said bit stream at a plurality of different times according to a first resolution to produce a set of correlation values and associated times; and
 - a processor circuit in communication with said integrated circuit and configured to control said integrated circuit to initiate a first

search for correlation of said bit stream with said reference code to produce a first set of correlation values and associated times and operable to initiate a second search for correlation of said bit stream with said reference code applied to said bit stream at a second plurality of different times to produce a second set of correlation values and associated times, said reference code being offset in time from a maximal correlation value of said first set such that said reference code is applied to said bit stream at times other than times of said first plurality, to produce a combined set correlation values operable to be used for determining a measure of the strength of said predefined code in said bit stream.

Claim 19 has been amended as follows:

19. A system comprising the apparatus of claim 18 and further comprising a baseband down converter for demodulating a quadrature encoded input signal to produce I and Q bit streams, said ~~searcher~~ searcher-integrated circuit including a correlator for correlating said reference code with said I and Q bit streams.